FIG. 1

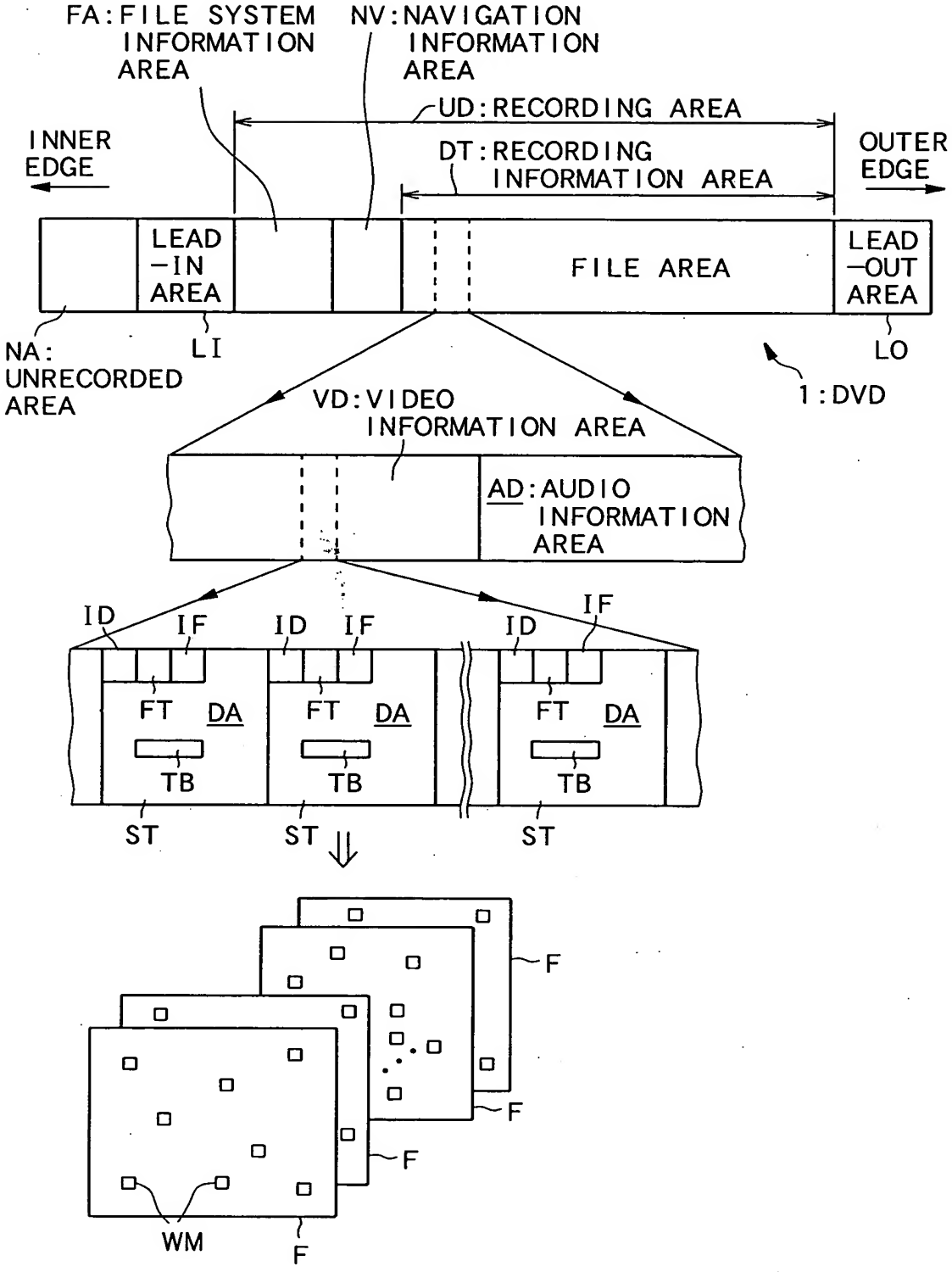

FA:FILE SYSTEM INFORMATION AREA
NV:NAVIGATION INFORMATION AREA
UD:RECORDING AREA
INNER EDGE
DT:RECORDING INFORMATION AREA
OUTER EDGE
LEAD -IN AREA
FILE AREA
LEAD -OUT AREA
NA: UNRECORDED AREA
LI
LO
1:DVD
VD:VIDEO INFORMATION AREA
AD:AUDIO INFORMATION AREA
ID
IF
FT
DA
TB
ST
F
WM

FIG. 2

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	CCI1:FIRST COPY CONTROL INFORMATION	1
3	CCI2:SECOND COPY CONTROL INFORMATION	1
4	XCI1:FIRST POST CONVERSION FIRST COPY CONTROL INFORMATION	1
5	XCI2:FIRST POST CONVERSION SECOND COPY CONTROL INFORMATION	1
6	XXI1:SECOND POST CONVERSION FIRST COPY CONTROL INFORMATION	1
7	XXI2:SECOND POST CONVERSION SECOND COPY CONTROL INFORMATION	1
8	PA: REPRODUCIBLE REGION INFORMATION	1
9	R:AUXILIARY INFORMATION	31
10	ECC:ERROR CORRECTION INFORMATION	17

(a) TB1

PICTURE QUALITY CHANGE	COPY CONTROL INFORMATION DURING DISTRIBUTION →	POST CONVERSION COPY CONTROL INFORMATION
ONE STEP LOWER	COPY PROHIBITED	COPY PERMITTED ONLY ONCE
	COPY PERMITTED ONLY ONCE	COPY PERMITTED
	COPY PERMITTED	COPY PERMITTED
TWO STEPS LOWER	COPY PROHIBITED	COPY PERMITTED
	COPY PERMITTED ONLY ONCE	COPY PERMITTED
	COPY PERMITTED	COPY PERMITTED
NO CHANGE	COPY PROHIBITED	COPY PROHIBITED
	COPY PERMITTED ONLY ONCE	COPY PERMITTED ONLY ONCE
	COPY PERMITTED	COPY PERMITTED

(b)

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	RP:POST RECORDING REPRODUCIBLE REGION INFORMATION	1
3	RR:POST RECORDING REPRODUCIBLE REGION INFORMATION	1
4	RT:POST RECORDING TIME-SHIFTABLE REGION INFORMATION	1
5	R:AUXILIARY INFORMATION	35
6	ECC:ERROR CORRECTION INFORMATION	17

(c) TB2

FIG. 3

BIT NUMBER	CONTENTS
1	ACCI1: FIRST REGION COPY CONTROL INFORMATION
2	
3	ACCI2: SECOND REGION COPY CONTROL INFORMATION
4	
5	ACCI3: THIRD REGION COPY CONTROL INFORMATION
6	
7	ACCI4: FOURTH REGION COPY CONTROL INFORMATION
8	

CCI1

(a)

BIT NUMBER	CONTENTS
1	ACCI5: FIFTH REGION COPY CONTROL INFORMATION
2	
3	ACCI6: SIXTH REGION COPY CONTROL INFORMATION
4	
5	ACCI7: SEVENTH REGION COPY CONTROL INFORMATION
6	
7	ACCI8: EIGHTH REGION COPY CONTROL INFORMATION
8	

CCI2

(b)

FIG. 4

BIT NUMBER	CONTENTS
1	AXCI1:FIRST REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
2	
3	AXCI2:SECOND REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
4	
5	AXCI3:THIRD REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
6	
7	AXCI4:FOURTH REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
8	

XCI1

(a)

BIT NUMBER	CONTENTS
1	AXCI5:FIFTH REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
2	
3	AXCI6:SIXTH REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
4	
5	AXCI7:SEVENTH REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
6	
7	AXCI8:EIGHTH REGION FIRST POST CONVERSION COPY CONTROL INFORMATION
8	

XCI2

(b)

BIT NUMBER	CONTENTS
1	AXXI1:FIRST REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
2	
3	AXXI2:SECOND REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
4	
5	AXXI3:THIRD REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
6	
7	AXXI4:FOURTH REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
8	

(c) XXI1

BIT NUMBER	CONTENTS
1	AXXI5:FIFTH REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
2	
3	AXXI6:SIXTH REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
4	
5	AXCI7:SEVENTH REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
6	
7	AXCI8:EIGHTH REGION SECOND POST CONVERSION COPY CONTROL INFORMATION
8	

(d) XXI2

JP/5256411

FIG. 5

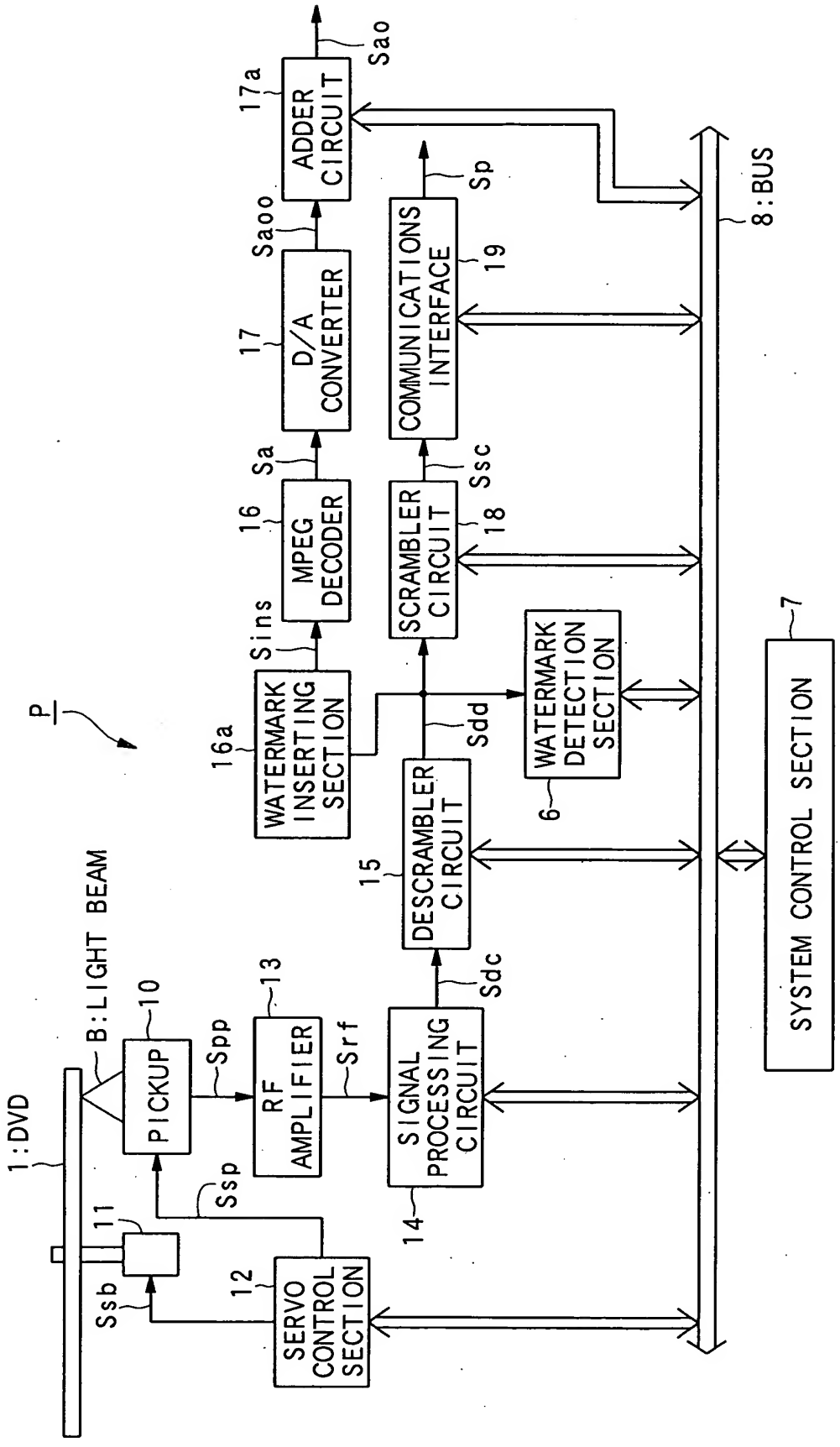

P
1:DVD
B:LIGHT BEAM
PICKUP
10
Spp
RF AMPLIFIER
13
Srf
SIGNAL PROCESSING CIRCUIT
14
Sdc
DESCRAMBLER CIRCUIT
15
Sdd
WATERMARK INSERTING SECTION
16a
Sins
MPEG DECODER
16
Sa
D/A CONVERTER
17
Saoo
ADDER CIRCUIT
17a
Sao
SCRAMBLER CIRCUIT
18
Ssc
COMMUNICATIONS INTERFACE
19
Sp
WATERMARK DETECTION SECTION
6
SERVO CONTROL SECTION
12
Ssb
11
Ssp
8:BUS
SYSTEM CONTROL SECTION
7

FIG. 6

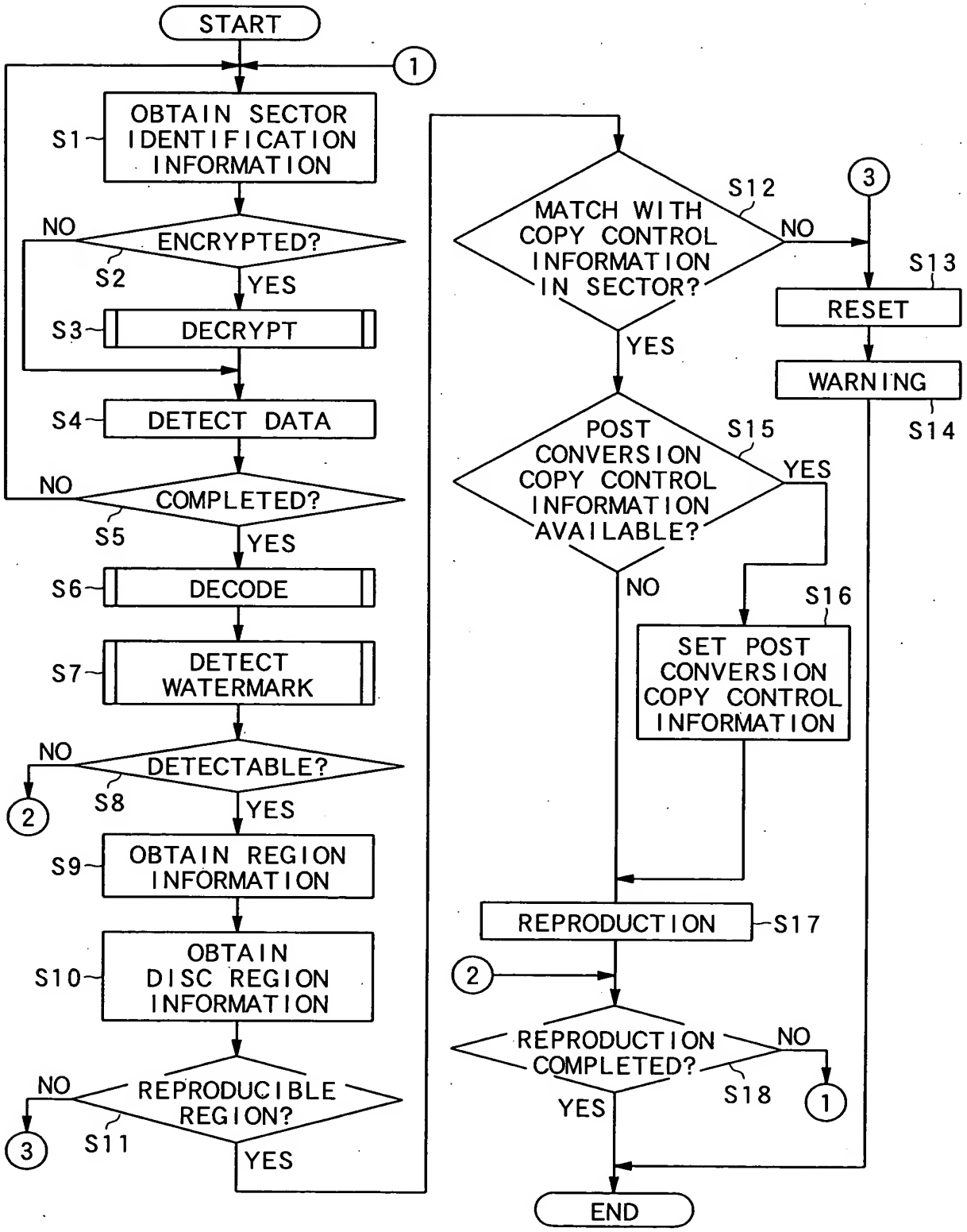

START
1
OBTAIN SECTOR IDENTIFICATION INFORMATION
S1
ENCRYPTED?
NO
S2
YES
DECRYPT
S3
DETECT DATA
S4
COMPLETED?
NO
S5
YES
DECODE
S6
DETECT WATERMARK
S7
DETECTABLE?
NO
S8
YES
2
OBTAIN REGION INFORMATION
S9
OBTAIN DISC REGION INFORMATION
S10
REPRODUCIBLE REGION?
NO
S11
YES
3
MATCH WITH COPY CONTROL INFORMATION IN SECTOR?
S12
NO
YES
3
S13
RESET
WARNING
S14
POST CONVERSION COPY CONTROL INFORMATION AVAILABLE?
S15
YES
NO
S16
SET POST CONVERSION COPY CONTROL INFORMATION
REPRODUCTION
S17
2
REPRODUCTION COMPLETED?
NO
S18
YES
1
END

FIG. 7

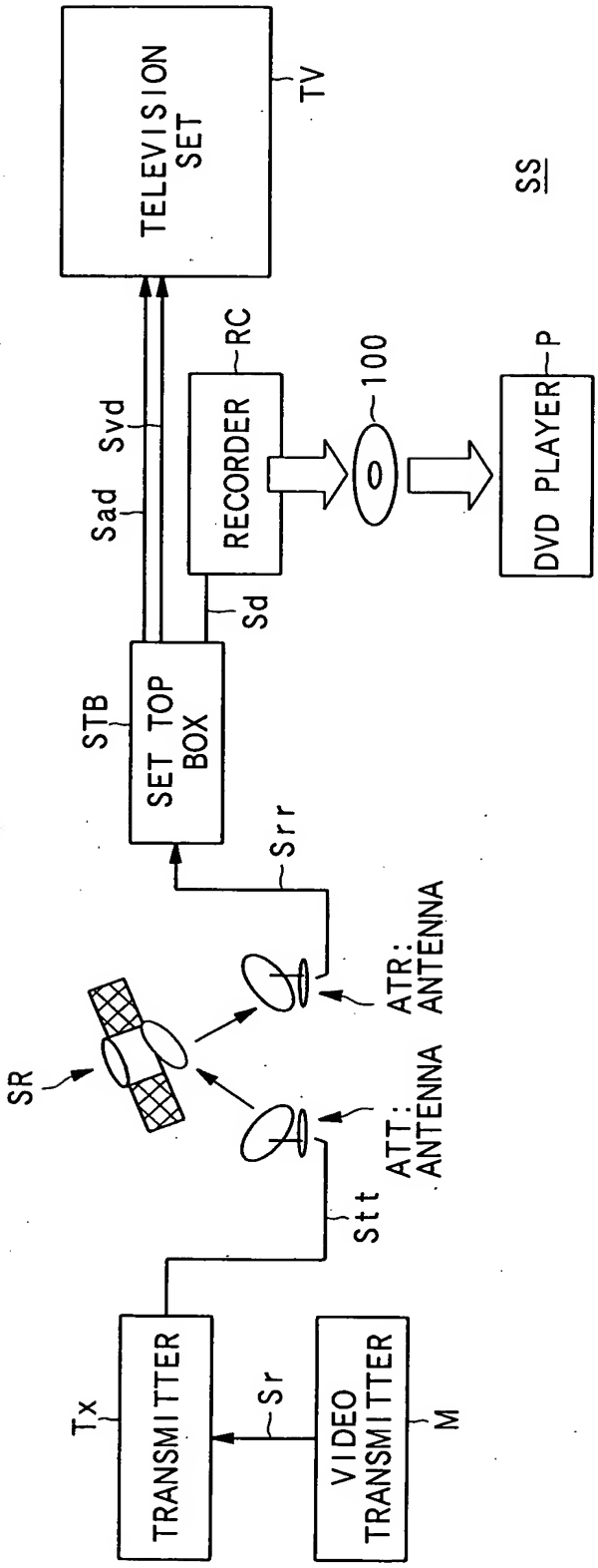

TELEVISION SET
TV
SS
RECORDER
RC
100
DVD PLAYER
P
Sad
Svd
Sd
STB
SET TOP BOX
Srr
ATR: ANTENNA
SR
ATT: ANTENNA
Stt
Tx
TRANSMITTER
Sr
VIDEO TRANSMITTER
M

FIG. 8

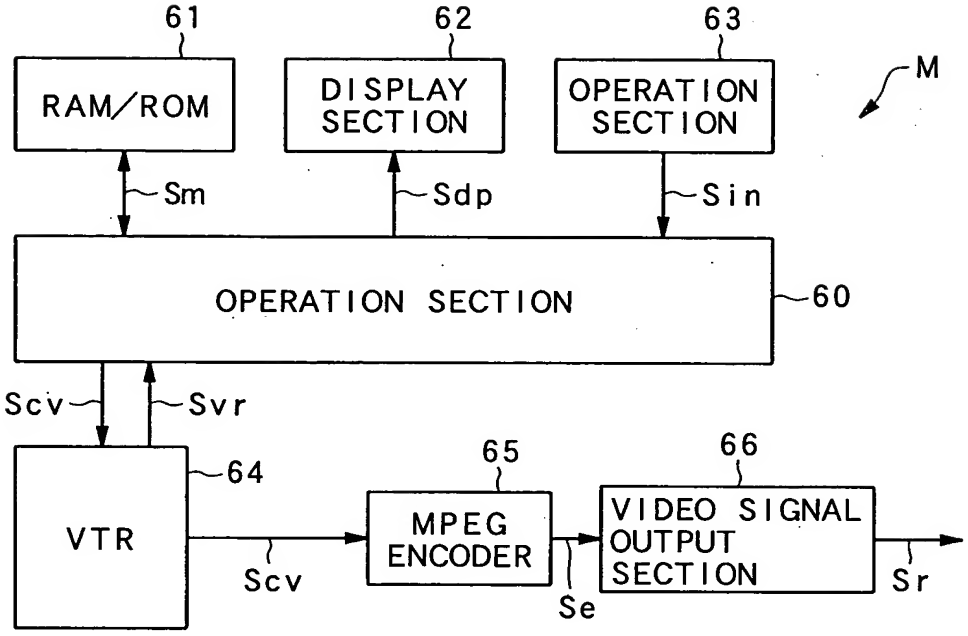

61
62
63
M
RAM/ROM
DISPLAY SECTION
OPERATION SECTION
Sm
Sdp
Sin
OPERATION SECTION
60
Scv
Svr
64
65
66
VTR
MPEG ENCODER
VIDEO SIGNAL OUTPUT SECTION
Scv
Se
Sr

FIG. 9

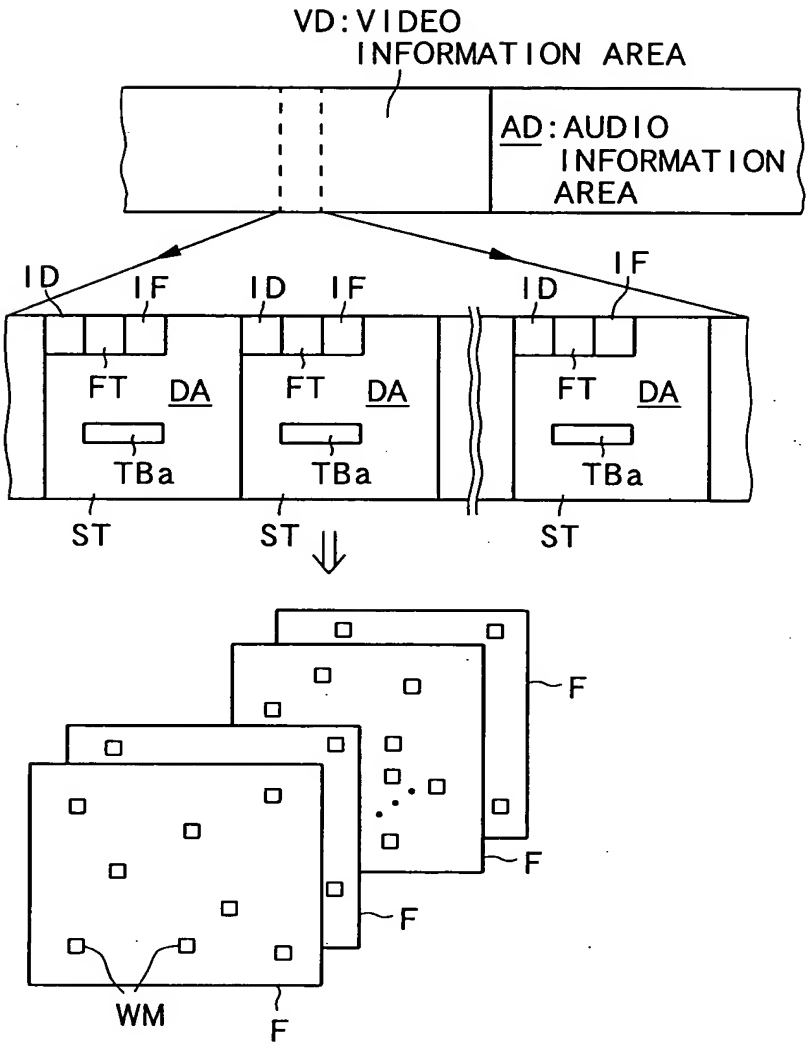

VD:VIDEO
INFORMATION AREA
AD:AUDIO
INFORMATION
AREA
ID
IF
ID
IF
ID
IF
FT
DA
FT
DA
FT
DA
TBa
TBa
TBa
ST
ST
ST
F
F
F
WM
F

FIG.10

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	CCI1:FIRST COPY CONTROL INFORMATION	1
3	CCI2:SECOND COPY CONTROL INFORMATION	1
4	XCI1:FIRST POST CONVERSION FIRST COPY CONTROL INFORMATION	1
5	XCI2:FIRST POST CONVERSION SECOND COPY CONTROL INFORMATION	1
6	XXI1:SECOND POST CONVERSION FIRST COPY CONTROL INFORMATION	1
7	XXI2:SECOND POST CONVERSION SECOND COPY CONTROL INFORMATION	1
8	PA:REPRODUCIBLE REGION INFORMATION	1
9	RAA:RECORDABLE REGION INFORMATION	1
10	TA:TIME-SHIFTABLE REGION INFORMATION	1
11	PT:VIEWABLE PERIOD INFORMATION	16
12	RT:RECORDABLE PERIOD INFORMATION	16
13	TT:TIME-SHIFTABLE PERIOD INFORMATION	1
14	ECC:ERROR CORRECTION INFORMATION	13

TB1a

(a)

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	CCI1:FIRST COPY CONTROL INFORMATION	1
3	CCI2:SECOND COPY CONTROL INFORMATION	1
4	XCI1:FIRST POST CONVERSION FIRST COPY CONTROL INFORMATION	1
5	XCI2:FIRST POST CONVERSION SECOND COPY CONTROL INFORMATION	1
6	XXI1:SECOND POST CONVERSION FIRST COPY CONTROL INFORMATION	1
7	XXI2:SECOND POST CONVERSION SECOND COPY CONTROL INFORMATION	1
8	PA:REPRODUCIBLE REGION INFORMATION	1
9	RAA:RECORDABLE REGION INFORMATION	1
10	RA:RECORDING REGION INFORMATION	1
11	PT:VIEWABLE PERIOD INFORMATION	16
12	RT:RECORDABLE PERIOD INFORMATION	16
13	TT:TIME-SHIFTABLE PERIOD INFORMATION	1
14	ECC:ERROR CORRECTION INFORMATION	13

TB1b

(b)

FIG.11

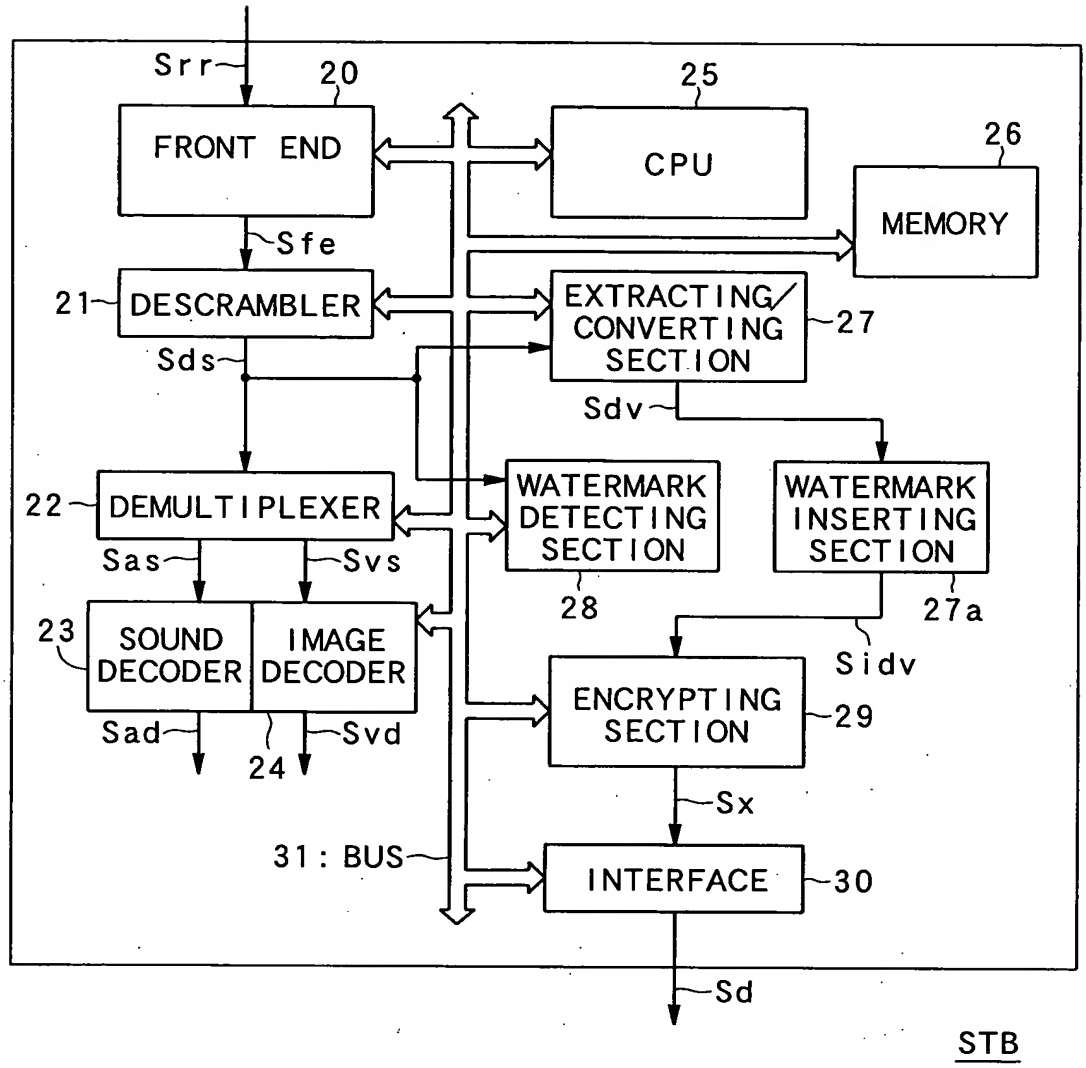

Srr
20
FRONT END
25
CPU
26
MEMORY
Sfe
21
Ddescrambler
EXTRACTING/
CONVERTING
SECTION
27
Sds
Sdv
22
DEMULTIPLEXER
WATERMARK
DETECTING
SECTION
WATERMARK
INSERTING
SECTION
Sas
Svs
28
27a
23
SOUND
DECODER
IMAGE
DECODER
Sidv
ENCRYPTING
SECTION
29
Sad
24
Svd
Sx
31 : BUS
INTERFACE
30
Sd
STB

FIG.12

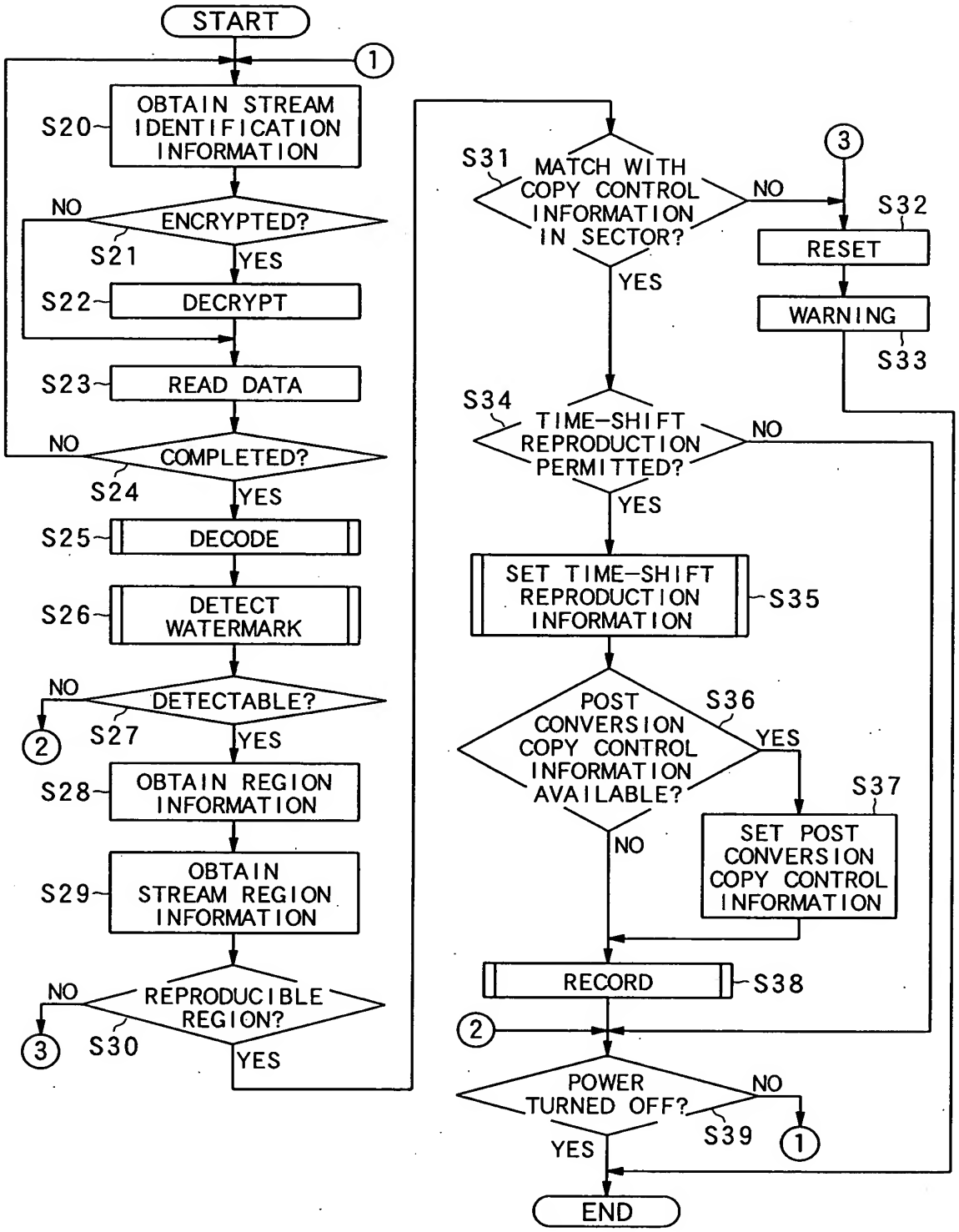

START
1
S20
OBTAIN STREAM IDENTIFICATION INFORMATION
NO
ENCRYPTED?
S21
YES
S22
DECRYPT
S23
READ DATA
NO
COMPLETED?
S24
YES
S25
DECODE
S26
DETECT WATERMARK
NO
DETECTABLE?
S27
YES
2
S28
OBTAIN REGION INFORMATION
S29
OBTAIN STREAM REGION INFORMATION
NO
REPRODUCIBLE REGION?
3
S30
YES
S31
MATCH WITH COPY CONTROL INFORMATION IN SECTOR?
NO
3
S32
RESET
WARNING
S33
YES
S34
TIME-SHIFT REPRODUCTION PERMITTED?
NO
YES
SET TIME-SHIFT REPRODUCTION INFORMATION
S35
POST CONVERSION COPY CONTROL INFORMATION AVAILABLE?
S36
YES
S37
SET POST CONVERSION COPY CONTROL INFORMATION
NO
RECORD
S38
2
POWER TURNED OFF?
NO
S39
1
YES
END

FIG.13

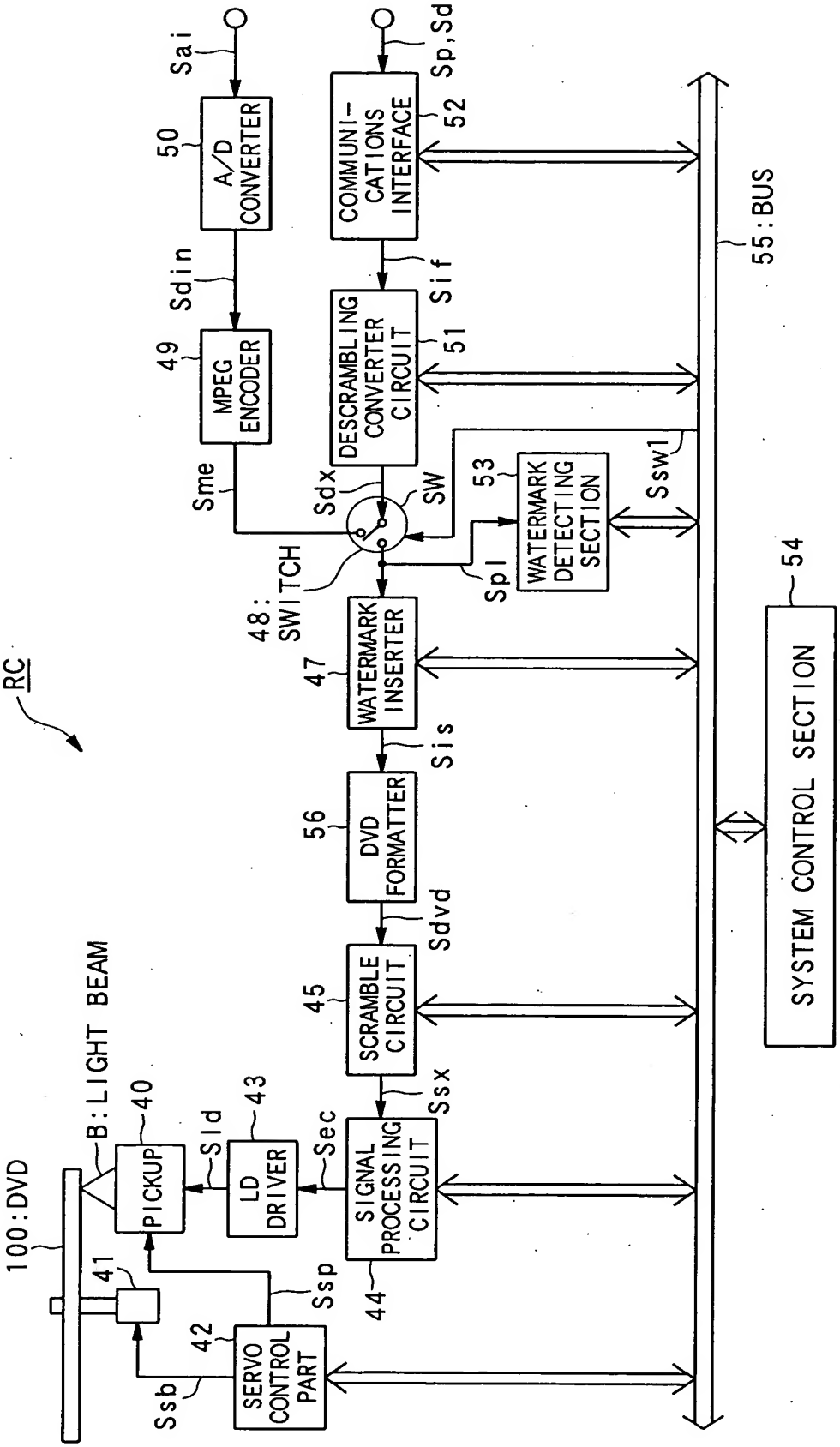

RC
100:DVD
B:LIGHT BEAM
41
42
Ssb
SERVO CONTROL PART
Ssp
40
PICKUP
Sld
43
LD DRIVER
Sec
44
SIGNAL PROCESSING CIRCUIT
Ssx
45
SCRAMBLE CIRCUIT
Sdvd
56
DVD FORMATTER
Sis
47
WATERMARK INSERTER
48: SWITCH
Sme
49
MPEG ENCODER
Sdin
50
A/D CONVERTER
Sai
Sdx
SW
Spl
53
WATERMARK DETECTING SECTION
Ssw1
51
DESCRAMBLING CONVERTER CIRCUIT
Sif
52
COMMUNI-CATIONS INTERFACE
Sp,Sd
55:BUS
54
SYSTEM CONTROL SECTION

FIG.14

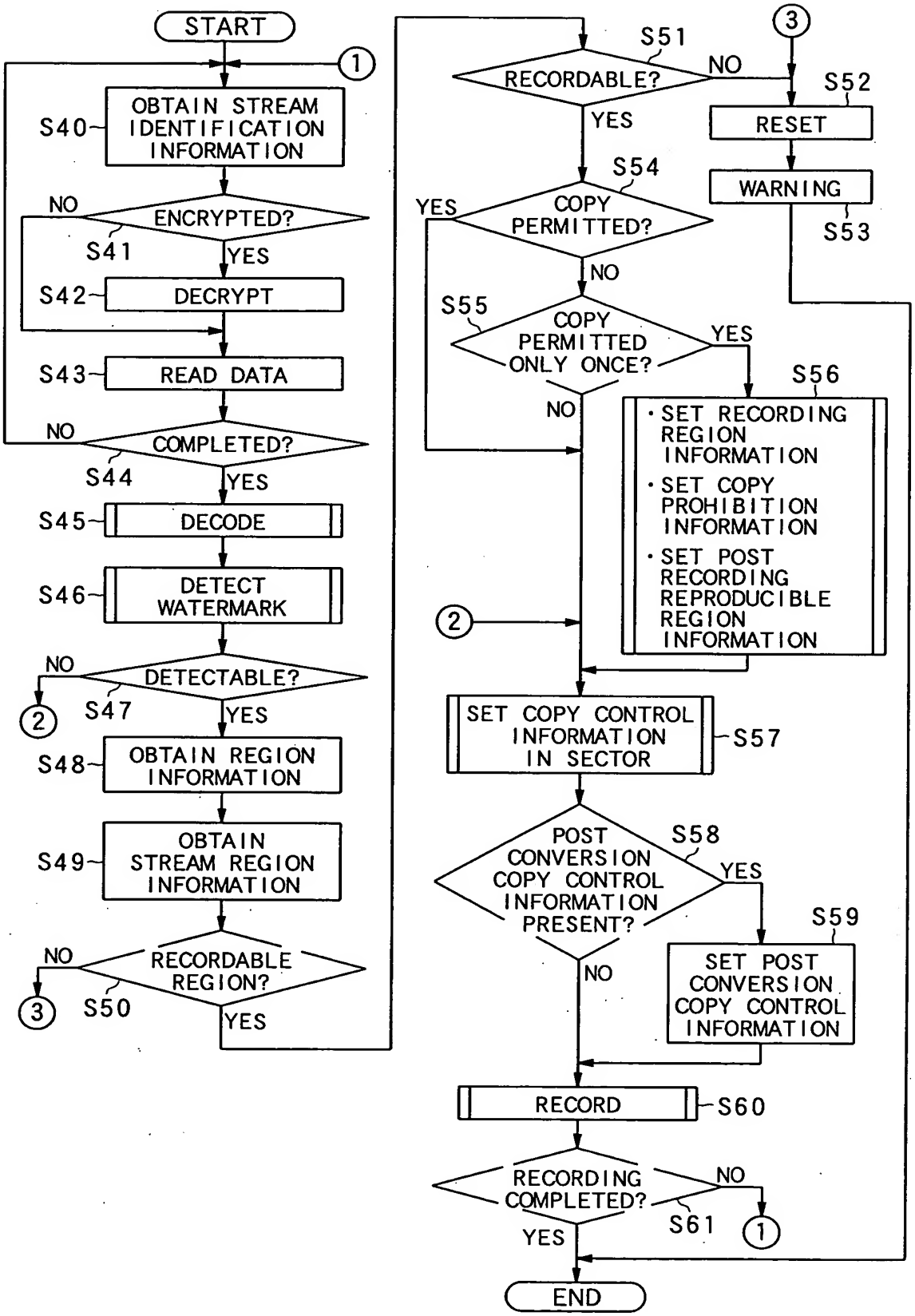

START
1
S40
OBTAIN STREAM IDENTIFICATION INFORMATION
NO
ENCRYPTED?
S41
YES
S42
DECRYPT
S43
READ DATA
NO
COMPLETED?
S44
YES
S45
DECODE
S46
DETECT WATERMARK
NO
DETECTABLE?
S47
YES
2
S48
OBTAIN REGION INFORMATION
S49
OBTAIN STREAM REGION INFORMATION
NO
RECORDABLE REGION?
3
S50
YES
S51
RECORDABLE?
NO
YES
3
S52
RESET
WARNING
S53
S54
YES
COPY PERMITTED?
NO
S55
COPY PERMITTED ONLY ONCE?
YES
NO
S56
・SET RECORDING REGION INFORMATION
・SET COPY PROHIBITION INFORMATION
・SET POST RECORDING REPRODUCIBLE REGION INFORMATION
2
SET COPY CONTROL INFORMATION IN SECTOR
S57
POST CONVERSION COPY CONTROL INFORMATION PRESENT?
S58
YES
NO
S59
SET POST CONVERSION COPY CONTROL INFORMATION
RECORD
S60
RECORDING COMPLETED?
NO
S61
1
YES
END

FIG.15

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	CCI1:FIRST COPY CONTROL INFORMATION	1
3	CCI2:SECOND COPY CONTROL INFORMATION	1
4	H1:FIRST HASH VALUE	1
5	XCI1:FIRST POST CONVERSION FIRST COPY CONTROL INFORMATION	1
6	XCI2:FIRST POST CONVERSION SECOND COPY CONTROL INFORMATION	1
7	XXI1:SECOND POST CONVERSION FIRST COPY CONTROL INFORMATION	1
8	XXI2:SECOND POST CONVERSION SECOND COPY CONTROL INFORMATION	1
9	ECC:ERROR CORRECTION INFORMATION	8

TB1ba

(a)

NUMBER	CONTENTS	NUMBER OF BYTES
1	HD:HEADER INFORMATION	1
2	H2:SECOND HASH VALUE	1
3	R:AUXILIARY INFORMATION	1
4	PA:REPRODUCIBLE REGION INFORMATION	1
5	RAA:RECORDABLE REGION INFORMATION	1
6	RA:RECORDING REGION INFORMATION	1
7	PT:VIEWABLE PERIOD INFORMATION	16
8	RT:RECORDABLE PERIOD INFORMATION	16
9	TT:TIME-SHIFTABLE PERIOD INFORMATION	1
10	ECC:ERROR CORRECTION INFORMATION	17

TB1bb

(b)

FIG.16

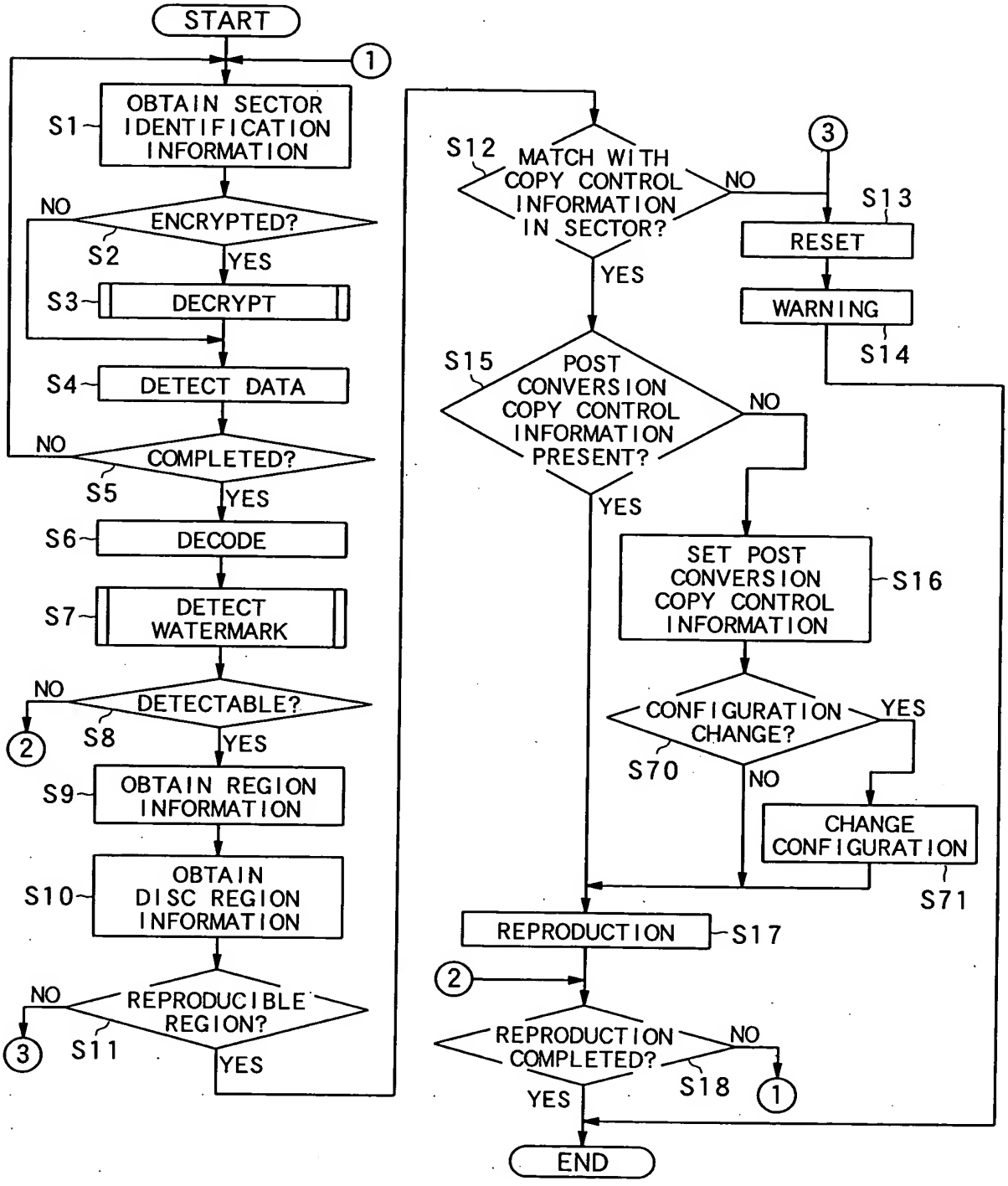

START
OBTAIN SECTOR IDENTIFICATION INFORMATION
S1
ENCRYPTED?
NO
YES
S2
DECRYPT
S3
DETECT DATA
S4
COMPLETED?
NO
YES
S5
DECODE
S6
DETECT WATERMARK
S7
DETECTABLE?
NO
YES
S8
OBTAIN REGION INFORMATION
S9
OBTAIN DISC REGION INFORMATION
S10
REPRODUCIBLE REGION?
NO
YES
S11
MATCH WITH COPY CONTROL INFORMATION IN SECTOR?
S12
NO
YES
RESET
S13
WARNING
S14
POST CONVERSION COPY CONTROL INFORMATION PRESENT?
S15
NO
YES
SET POST CONVERSION COPY CONTROL INFORMATION
S16
CONFIGURATION CHANGE?
S70
YES
NO
CHANGE CONFIGURATION
S71
REPRODUCTION
S17
REPRODUCTION COMPLETED?
S18
NO
YES
END
1
2
3

FIG.17

NUMBER	CONTENTS	NUMBER OF BYTES
1	CCI:FIRST COPY CONTROL INFORMATION	1
2	XCI:SECOND COPY CONTROL INFORMATION	1
3	XXI:THIRD COPY CONTROL INFORMATION	1
4	R:AUXILIARY INFORMATION	36
5	ECC:ERROR CORRECTION INFORMATION	17

TBC

10/525641

FIG.18

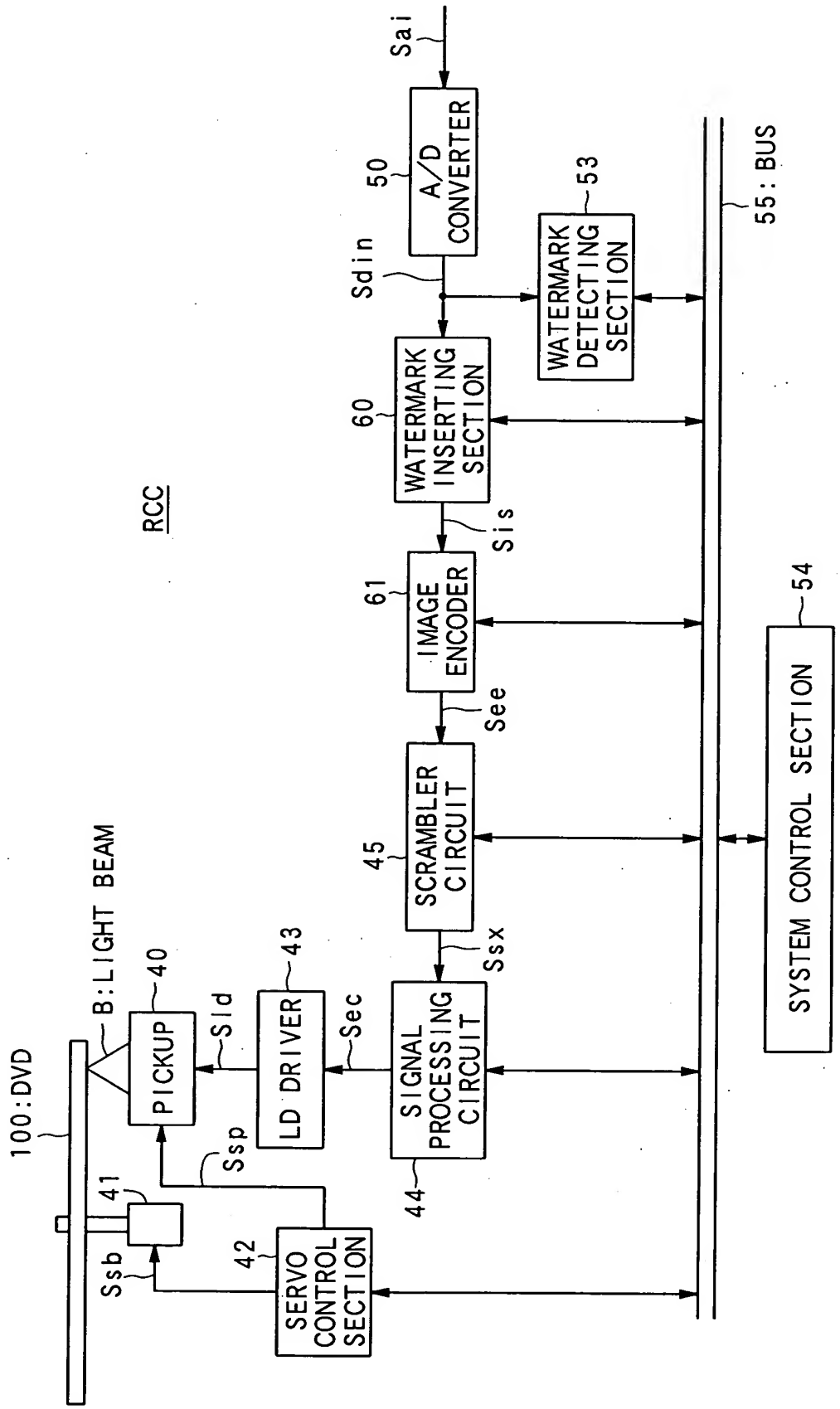

RCC
100:DVD
B:LIGHT BEAM
PICKUP
40
Sid
LD DRIVER
43
Sec
SIGNAL PROCESSING CIRCUIT
44
Ssx
SCRAMBLER CIRCUIT
45
See
IMAGE ENCODER
61
Sis
WATERMARK INSERTING SECTION
60
Sdin
A/D CONVERTER
50
Sai
WATERMARK DETECTING SECTION
53
55: BUS
SYSTEM CONTROL SECTION
54
SERVO CONTROL SECTION
42
Ssp
41
Ssb

FIG.19

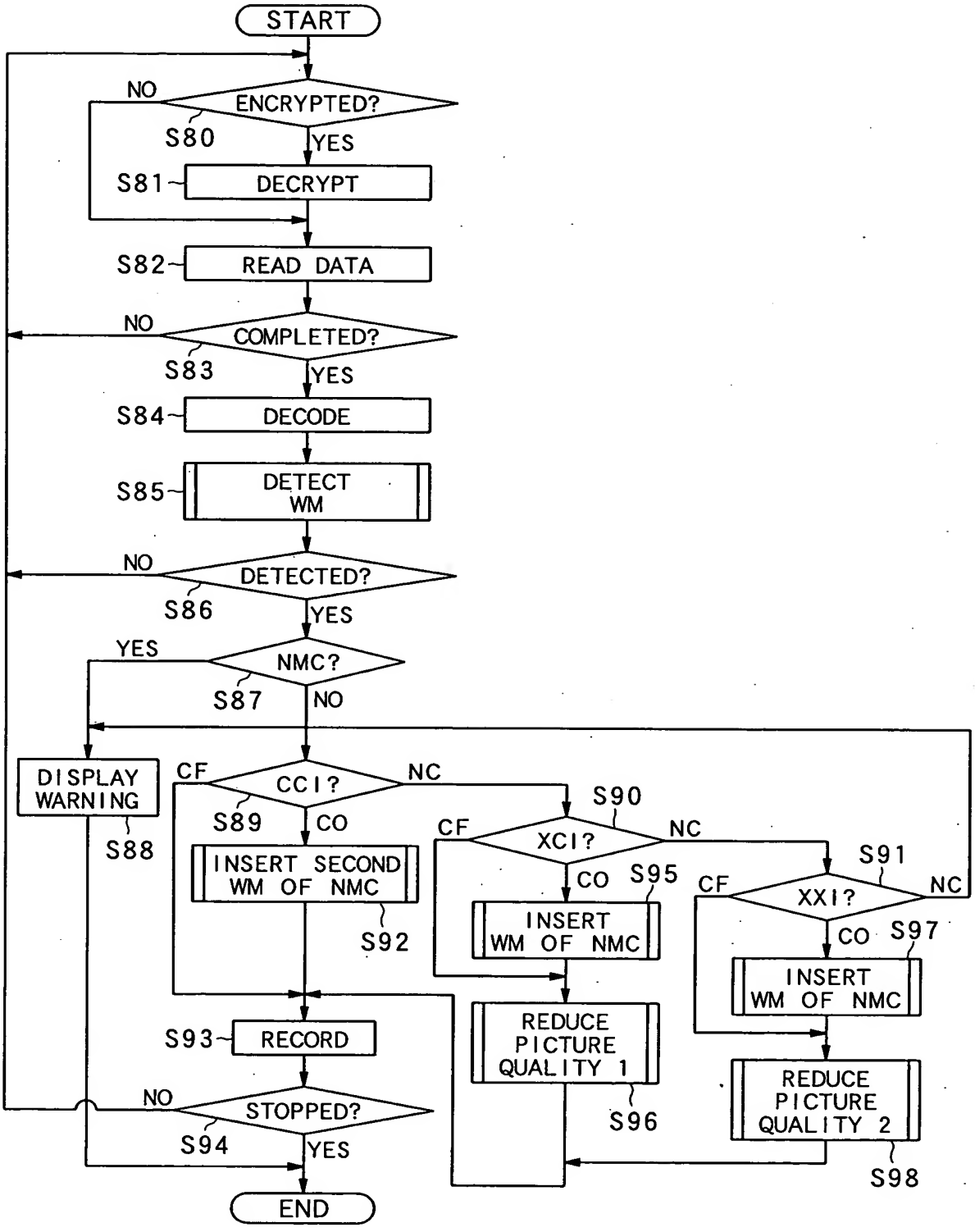

START
NO
ENCRYPTED?
S80
YES
S81
DECRYPT
S82
READ DATA
NO
COMPLETED?
S83
YES
S84
DECODE
S85
DETECT WM
NO
DETECTED?
S86
YES
YES
NMC?
S87
NO
DISPLAY WARNING
S88
CF
CCI?
NC
S89
CO
INSERT SECOND WM OF NMC
S92
S90
CF
XCI?
NC
CO
S95
INSERT WM OF NMC
S91
CF
XXI?
NC
CO
S97
INSERT WM OF NMC
S93
RECORD
REDUCE PICTURE QUALITY 1
S96
REDUCE PICTURE QUALITY 2
S98
NO
STOPPED?
S94
YES
END

FIG. 20

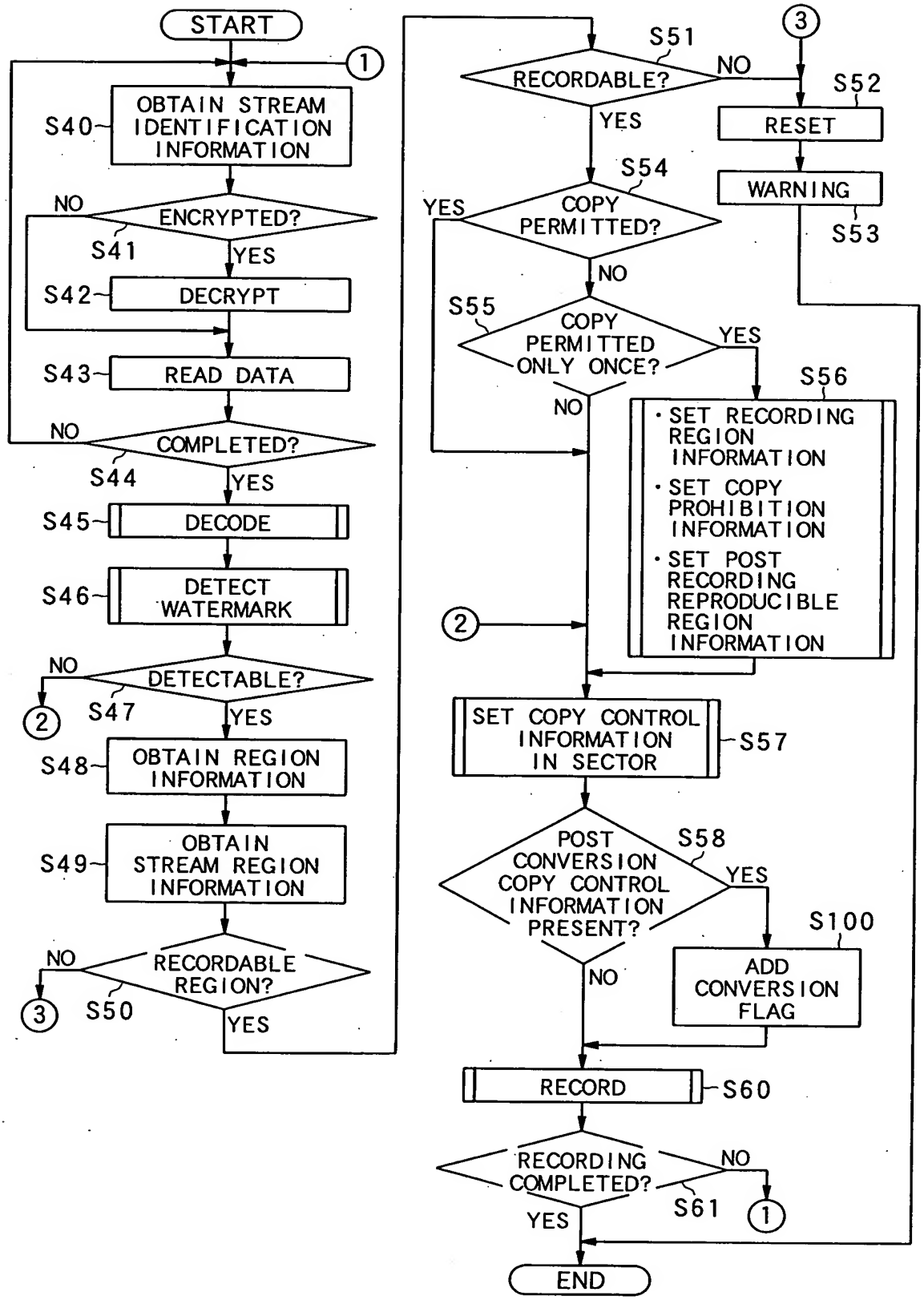

START
OBTAIN STREAM IDENTIFICATION INFORMATION
S40
ENCRYPTED?
S41
NO
YES
DECRYPT
S42
READ DATA
S43
COMPLETED?
S44
NO
YES
DECODE
S45
DETECT WATERMARK
S46
DETECTABLE?
S47
NO
YES
OBTAIN REGION INFORMATION
S48
OBTAIN STREAM REGION INFORMATION
S49
RECORDABLE REGION?
S50
NO
YES
RECORDABLE?
S51
NO
YES
RESET
S52
WARNING
S53
COPY PERMITTED?
S54
YES
NO
COPY PERMITTED ONLY ONCE?
S55
YES
NO
S56
• SET RECORDING REGION INFORMATION
• SET COPY PROHIBITION INFORMATION
• SET POST RECORDING REPRODUCIBLE REGION INFORMATION
SET COPY CONTROL INFORMATION IN SECTOR
S57
POST CONVERSION COPY CONTROL INFORMATION PRESENT?
S58
YES
NO
ADD CONVERSION FLAG
S100
RECORD
S60
RECORDING COMPLETED?
S61
NO
YES
END
1
2
3

FIG. 21

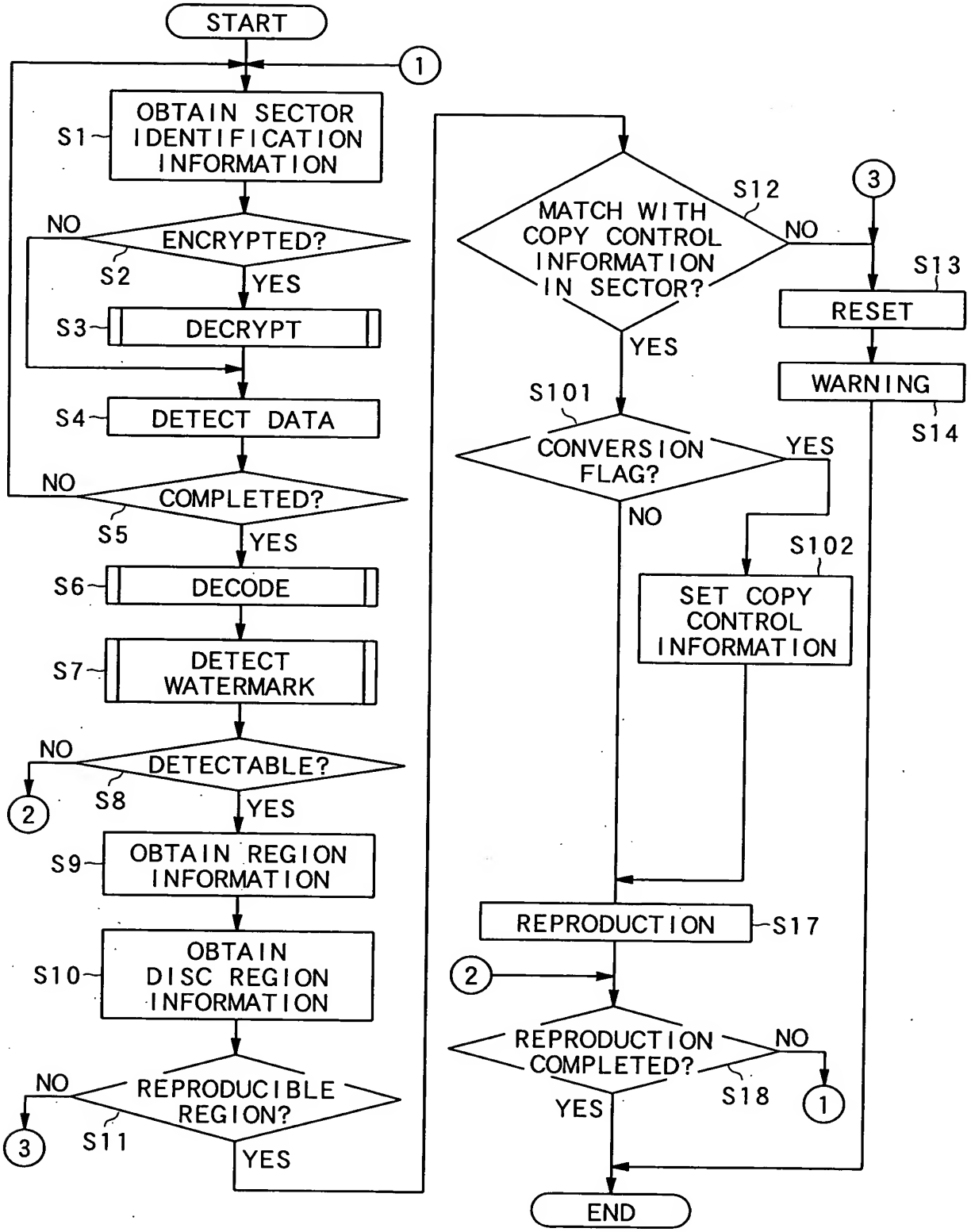
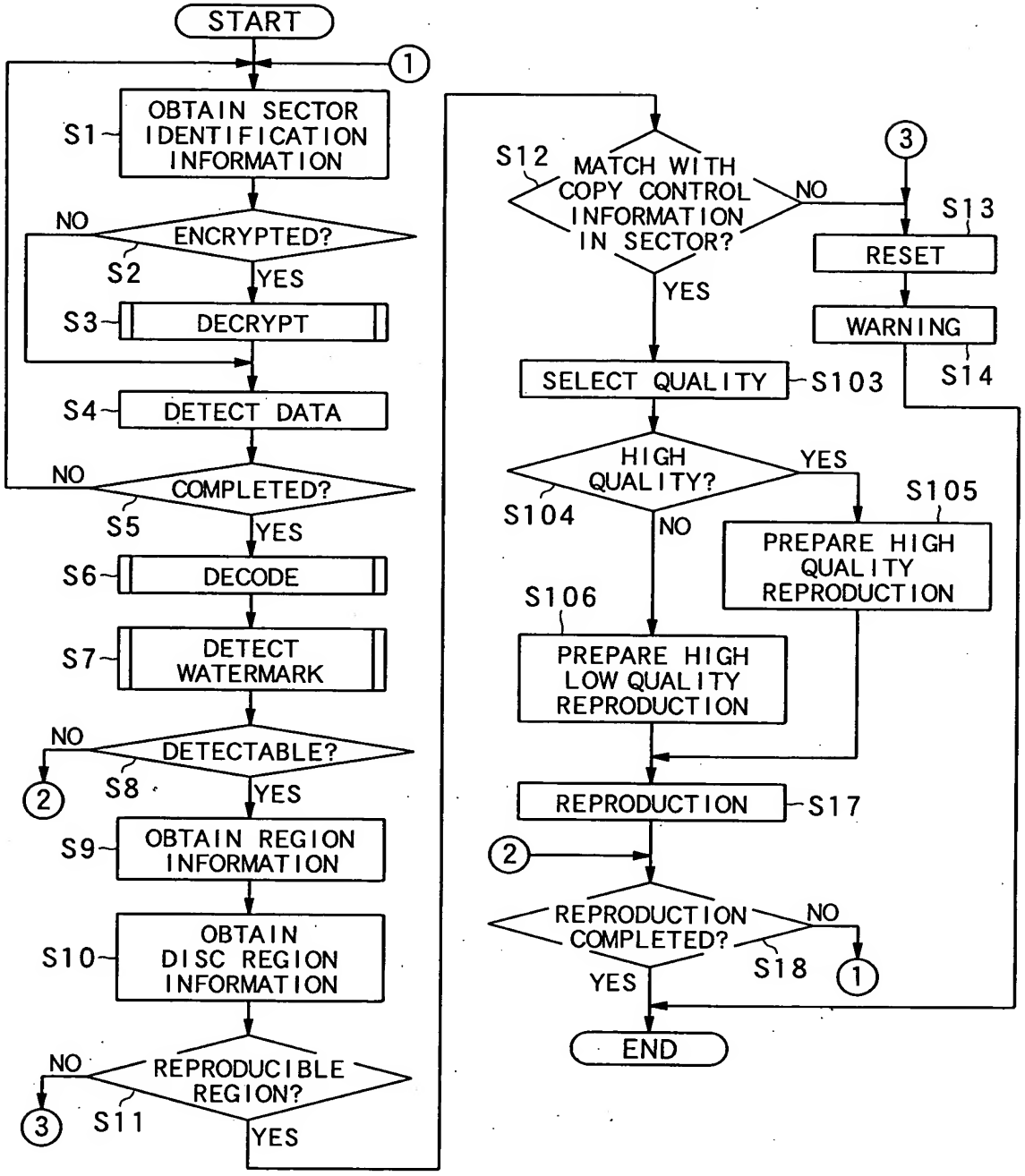

START
1
S1
OBTAIN SECTOR IDENTIFICATION INFORMATION
NO
ENCRYPTED?
S2
YES
S3
DECRYPT
S4
DETECT DATA
NO
COMPLETED?
S5
YES
S6
DECODE
S7
DETECT WATERMARK
NO
DETECTABLE?
S8
YES
2
S9
OBTAIN REGION INFORMATION
S10
OBTAIN DISC REGION INFORMATION
NO
REPRODUCIBLE REGION?
3
S11
YES
S12
MATCH WITH COPY CONTROL INFORMATION IN SECTOR?
NO
3
S13
RESET
WARNING
S14
YES
S101
CONVERSION FLAG?
YES
NO
S102
SET COPY CONTROL INFORMATION
REPRODUCTION
S17
2
REPRODUCTION COMPLETED?
NO
S18
1
YES
END

FIG. 22


START
1
S1
OBTAIN SECTOR IDENTIFICATION INFORMATION
NO
ENCRYPTED?
S2
YES
S3
DECRYPT
S4
DETECT DATA
NO
COMPLETED?
S5
YES
S6
DECODE
S7
DETECT WATERMARK
NO
DETECTABLE?
S8
YES
2
S9
OBTAIN REGION INFORMATION
S10
OBTAIN DISC REGION INFORMATION
NO
REPRODUCIBLE REGION?
3
S11
YES
S12
MATCH WITH COPY CONTROL INFORMATION IN SECTOR?
NO
3
S13
RESET
WARNING
S14
YES
SELECT QUALITY
S103
HIGH QUALITY?
S104
YES
S105
PREPARE HIGH QUALITY REPRODUCTION
NO
S106
PREPARE HIGH LOW QUALITY REPRODUCTION
REPRODUCTION
S17
2
REPRODUCTION COMPLETED?
NO
S18
1
YES
END